Winter 12-1933

# Volume 43 - Issue 3 - December, 1933

Rose Technic Staff
*Rose-Hulman Institute of Technology*

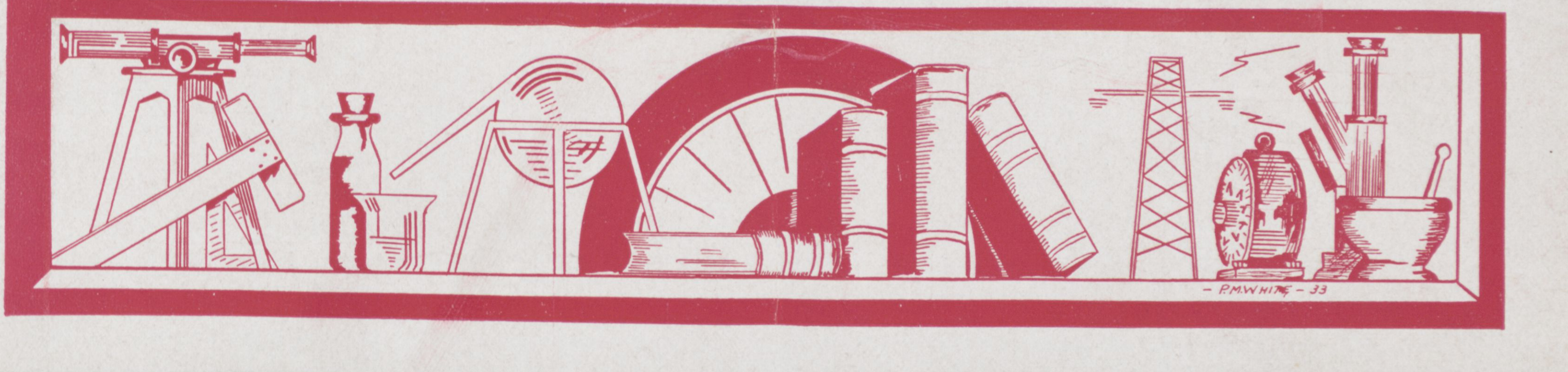
# ROSE TECHNIC

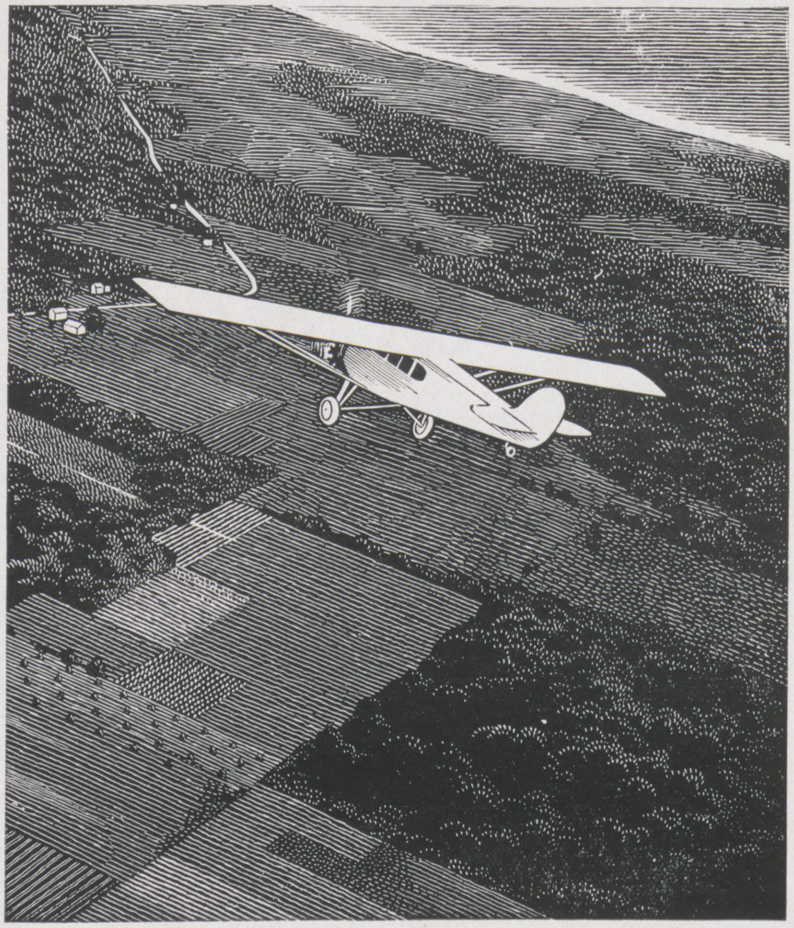
Member Engineering College Magazines Associated

ROSE POLYTECHNIC INSTITUTE « « » » TERRE HAUTE, INDIANA

December, 1933

Vol. XLIII « Number 3





# A bird's-eye view showed the way

Telephone engineers recently found the best route for a new telephone line by taking a bird's-eye view of their difficulties.

The territory was heavily wooded, spotted with swamps and peat beds, with roads far apart. So a map was made by aerial photography. With this map, the best route was readily plotted, field work was facilitated.

Bell System ingenuity continues to extend the telephone's reach—to speed up service—to make it more convenient, more valuable to you

## BELL SYSTEM

TELEPHONE HOME AT LEAST ONCE A WEEK . . .
REVERSE THE CHARGES IF THE FOLKS AGREE

## Surveying This Issue

VISITORS at A Century of Progress Exposition this summer no doubt noticed some houses which were built of steel. This product has been brought to the attention of the public as one of the important building materials of the future. In an interesting article, written as a part of Tau Beta Pi work, William C. Eyke, describes how steel is being used in home construction.

ONE of the improvements which is being made by the railroads is the electrification of portions of their systems. Mr. Keller has written an article for Tau Beta Pi describing how electricity is replacing steam in railroad.

THOSE students who have been reading the local newspapers of late have learned that Terre Haute is planning to install a new street lighting system in the downtown and Twelve Points district. The money for the work is to come from a loan made possible by the federal government. Mr. Jacob has described in detail on page 12 of this issue, as a part of Tau Beta Pi work, the plan which has been proposed.

ON page 19 appears a student directory giving in alphabetical order by classes the names, home addresses, and course of the students enrolled at present. This list will serve as reference and will be of value in finding addresses.

—*J. J. H.*


# THE ROSE TECHNIC

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*Engineering College Magazines Associated*
*Mr. Robley Winfrey, Chairman, Engineering Hall, Ames, Iowa.*

Colorado Engineer, Cornell Civil Engineer, Illinois Technograph, Iowa Engineer, Iowa Transit, Kansas Engineer, Penn State Engineer, Kansas State Engineer, Marquette Engineer, Michigan Technic, Minnesota Techno-log, Nebraska Blue Print, North Dakota State Engineer, Ohio State Engineer, Purdue Engineer, Rose Technic, Sibley Journal, Tech Engineering News, Pennsylvania Triangle, Wisconsin Engineer, Oregon State Technical Record

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The new bridge spanning the harbor at Sydney, Australia. It is the world's largest bridge, 3,770 feet long.

# THE ROSE TECHNIC

THE TECHNICAL JOURNAL OF THE ROSE POLYTECHNIC INSTITUTE

Volume XLIII DECEMBER, 1933 Number 3


# Steel as Used in Home Construction


William C. Eyke, c., '35


ONE of the most recent developments in the design of modern residences embodies the use of structural steel as the main material of construction. The principle has undergone a period of very careful, conscientious experimentation, and architects are now ready to offer the general public types that are based on sound engineering methods. The employment of steel for this purpose exhibits numerous characteristics that are desired by home-seekers today. To cite some of these advantages, one might urge that its use as framing provides a material that will not shrink, is decidedly noncombustible, has increased measures of sanitation and rigidness, resists the deterioration affects of insects and weather conditions, and can readily be made permanent. The use of steel as wall covering and floor bases extends the same general benefits, incorporated with its ease of fabrication and application. For some time steel has had such collateral uses as roofing, lathing, window sash, and to some extent as supporting beams, but its more varied use in the modern home enters a rather new realm of design.

To discuss the many systems that have been developed and the detailed intricacies of construction methods would require too much space, therefore the general characteristics alone will be presented. Steel houses are naturally divided into two classes, frame and frameless. At present the former holds the bright spot in public opinion, but the latter is rapidly increasing in favor.

Frames in themselves require the use of four general types of structural steel: I-beams, channels, pipes, and angles. Concrete foundations seem the most popular and most economical because of the ease of connecting them to the rest of the structure by means of anchor bolts extending from the lower members of the frame into the concrete proper. Such connections serve their purpose excellently. Vertical supporting columns are usually in the form of 4½″ steel pipes, erected directly above concrete piling underneath the foundation. Such methods of construction insure rigid support for the upper portions of the frame and horizontal supporting members. The horizontal members of the outer frame are generally composed of steel channels of which the 9″ size is very popular at the present time. These are easily attached to the pipe columns by means of bolts and welding. The channels are erected in such a manner that their flanges project outwards, as can be seen in figure I. To the lower half of the channel is riveted or welded a piece of angle iron for the purpose of supporting the floor steel. The floor construction is of Z-shaped bars, 5″ high and 9″ wide. (See figure II). Succeeding members overlap one another a little and are secured by spot welding at the points of contact. An insulating flooring is applied directly over the Z-bars. Where wood floors are to be used, the supporting framework assumes a quite different character. For this purpose the supporting frame is constructed of junior I beams. The beams are of two kinds: main carrying members and cross members, so designated

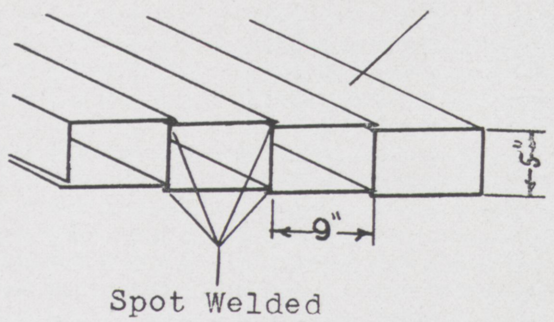


Figure II, Floor Construction

because of their use. Main members are supported directly on the foundation or horizontal portions of the frame, and extend, slightly above the cross members. The cross members are secured to the main members by standard stirrup hangers and welding or bolts. Above this framework the joists for the floor are fastened. Stran-steel studs or joists offer a very unique development in structural steel. In this system, each member has two webs containing lengthwise corrugations which can be nested together in such a manner that a nail driven between the two webs is held so firmly that it requires a drawing force of 500 pounds to extract it. Riviting and welding along the corrugations constitute the methods of fastening the two webs together. Such a construction is shown in figure III. Insulating wall board or lath work can then be applied to the studs by nailing. Roof rafters are of I-beam or channel construction, above which is placed a covering of sheet metal. Enameled steel shingles are finding much favor in their use as an upper roofing material which is very resistant to wear and almost unaffected by severe weather. The outer wall is sometimes made up of corrugated sheet steel, enameled or painted to suit the owner. In many cases, metal lathing is fastened to the vertical members of the frame and stucco applied as the outer wall surface. Experiments are being carried on with other designs of sheet steel for wall surface, and there seems to be no doubt that in the near future many types will be offered to the public. In nearly all cases an insulating material is applied between the outer and inner walls to counteract the high conductivity of the steel. Those who have a preference for brick houses may still satisfy their desires regardless of the fact that the framework is constructed of steel.

In frameless steel houses means must be taken to prevent the steel sections from buckling. To this end, the sheets are either heavily corrugated or stiffened by vertical shapes fastened to the sheets, or have angular depressions built in them in the factory. Houses of this type are more easily erected because the sections can be shipped from the mills completely fabricated and ready to put together. The various sheets can then be welded or bolted together at the proposed building site, and no cutting will be necessary on the job. The construction of the floor is essentially the same as that employed in the steel frame houses. A most recent development in field of frameless houses is the so-called secular unit house which incorporates a principle in which the sections of steel are narrow and properly fit together to form the walls, floors, and roof. An economic consideration is that the units can be fabricated at the factory according to the specifications of the contractor.

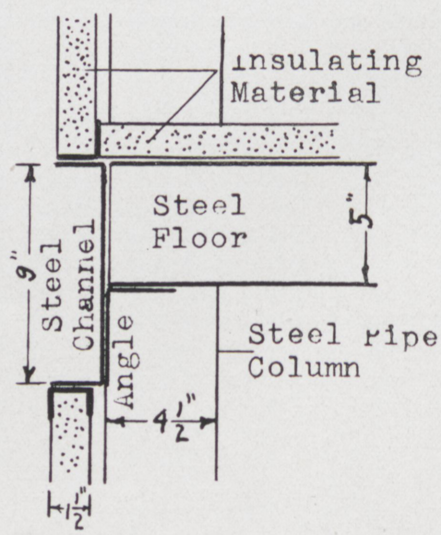
There are three fundamental requirements that should be satisfied by the steel used for framing purposes: (1) Structural strength, (2) Connectibility, and (3) Durability.

## Structural Strength

In many of the systems of steel frame construction the members used are of thin section, supplied in the form of flat sheets or rolled strip, formed by cold bending or rolling, with or without the use of welding. Such members have properties fully covered by well known standards as regards their use as joists or studs. The newer developments which employ sheet steel for framing, such as struts, girts, and panels, have heretofore been untested, and insufficient knowledge of their behavior when subjected to stress is at hand to warrant any formation of rules for their use. Up till the very present little information has been available to architects and engineers that will enable them to prepare even a preliminary design that will forecast the efficiency of the new forms of sheet steel when used as structural members. It is a well known phenomenon that large unbraced areas of sheet steel will buckle to a large degree when subjected to bending or compressive stresses. Difficulties of this type are largely overcome by the use of some type of stiffener. Three methods in much use today are corrugating the sheets, pressing in them appreciable depressions running longitudinally to the direction of action of the forces, and by fastening to the sheets some shape such as an angle, that is capable of resisting such stresses. One of the most important questions that arises in connection with the use of the elements of the section concerns the width of the section that can be considered effective in resisting the bending stresses applied. A table has been drawn up for this purpose, but it is strongly recommended by leading architects and engineers that extended tests be made to check a design based on this table.

## Connectibility

As to connectibility, there are two features to be considered. The members must be suitable for the attachment of enveloping materials by means of nails, laths, or masonry anchors. There are several well known methods of



Fignre I, showing the frame construction connecting steel members to each other, such as welding and riveting; but regardless of their rather high degree of success, no set standards can be formulated for their use.

Sheet steel is easily welded by either electric arc or oxyacetylene torch. Many times the addition of a filler material can be obviated by drawing the metal from the two sections adjacent to the line of connection. For multiple shop work the electric resistance process is very efficient in seam and spot welding. However, its use in the construction of steel homes is very difficult because of its great weight and the inaccessibility of the parts to be welded and therefore the other two methods mentioned are in general more popular for use at the residence site.

The connection of sheet steel members to each other by means other than welding differs from the customary methods in the case of rolled shapes in that in the former the thinness greatly reduces the bearing surfaces between the steel and the rivets or bolts. This disadvantage has led to the development of various ingenious methods of connection. The Stran-steel principle, already discussed, is the most noteworthy example. The use of this type of steel greatly facilitates the connection of laths or wall boards by means of nails. Another method worthy of note is the Hul-lo-wen principle which employs the use of prongs, either fastened to or stamped out of the metal which constitute the conecting medium for the steel lath.

## Durability

Problems encountered in connection with the durability of steel ultimately deal with its resistance to corrosion, a property which is best determined from extended experimentation. Records of buildings in which the steel has been uncovered for examination purposes tend to show that a fairly high corrosion resistance can be expected from steel used in properly constructed residences. Through the use of adequate protection measures it is possible to protect completely the steel from corrosion. In the main this involves the exclusion of oxygen in presence of water, while contact with warm dry air is a much desired condition. Thus the steel in a correctly heated house is little susceptible to the effects of corrosion.

Analysis indicates that when steel is first used as a structural material and during its period of service, it is enveloped by a thin yet hard and dense oxide film, which serves amply as a protective covering. Copper and paint coatings serve excellently to reduce corrosion in residence steel to a minimum. Experments show methods when applied to a clean dry steel surface, and not subjected to adverse conditions, are yet intact, after thirty years. Zinc

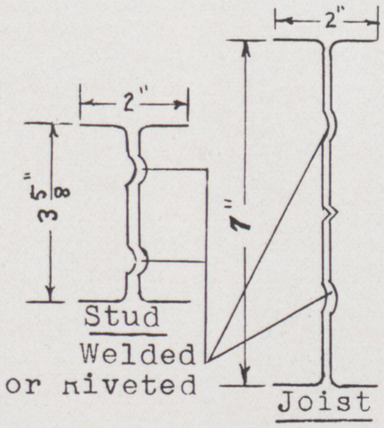


Figure III, Supporting framework for use with wood floors.

chromate, red lead, white and blue lead, and zinc oxide are especially suitable priming coats that are easily applied with either spray or brush.

The use of sheet steel for wall coverings is not an entirely new practice, since corrugated sheets have long been used for such purposes. Additional characteristics of permanence and appearance greatly modified this type of sheets for residences. Although used for many years in some European homes, it was not until 1920 that vitreous enameled sheet steel was introduced in America for this purpose. In the first buildings, 24 gauge ferro enameled shingles in two colors were used as siding, backed with insulating asphalt roofing felt. A resistant metal, ferroclad, is supported by the structural steel of the framework, and to this metal the asphalt felt is attached. The demand for enameled sheet steel greatly revived the enameling business because these coatings lend themselves to many designs and colors, offer a large selection of texture of finish, are very durable, and present an easily cleaned surface. The durability of enameled steel shingles is presaged by the well-know lasting quality of enamel on outdoor signs and ferro-enameling has been found to be unimpaired after ten years of service. It is therefore very likely that this material will find extensive use in future building.

Enamel is a form of glass, consisting usually of silicates and borates, fused into either sheet steel or cast iron at high temperatures. The materials used are first subjected for about eight hours to a temperature approximating 3000 degrees Fahrenheit, after which the white hot liquid is discharged from the furnace into cold water, thereby hardening the enamel glass and causing it to shatter into fine particles. It is then ground and sprayed upon the metal. Heat is next applied to the sheet until a temperature of 1500 degrees Fahrenheit is reached, at which point the enamel fuses. Upon cooling, two more layers are similarily applied and the resulting coating is a hard smooth, lusterous surface ready for use.

Recent exhibitions of steel residences at the Century of Progress exposition revealed that public sentiment is rapidly shifting in their favor. One of the most common objections to the use of steel in residence construction was the factory-like appearance of the fabricated forms. New methods of applying attractive coatings have practically removed this criticism. Cost of construction in itself seems to be somewhat less than for other kinds of homes, although the actual cost of materials may be somewhat higher. Whatever extra cost there may be appears to be more than offset by the desirability, high corrosion resistance, lasting rigidity, and fireproof character of the structure without any sacrifice in form or appearance.

# Kilowatts for Coal in the Iron Horse

By John H. Keller, c.,'34

SINCE the beginning of time man has sought some means of transportation to satisfy his desire to travel. At first he walked; then he used beasts to carry him and his goods from place to place; later he invented vehicles such as the sled and wheeled conveyances. But as civilization progressed and population increased these means were inadequate; he needed something faster. Until the beginning of the nineteenth century little advance had been made in the methods of land transportation since the time of the Egyptians. The first real step was taken in 1801 when Robert Trevithick combined James Watt's steam engine with his own ideas and produced the "Iron Horse".

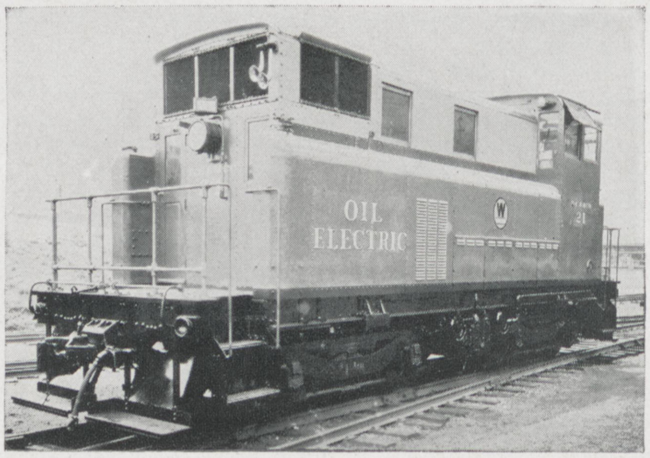
For a little over a century the steam locomotive has been the dominating agent of commercial transportation; it has played an indispensible part in the tremendous economic development of the past few decades. But with the steady march of technical progress, steam power is being supplanted by electrical power. The Iron Horse is changing his diet from coal to kilowatts.

The trend toward electrification of railways is exemplified by the recent program of the Pennsylvania Railroad, scheduled for completion in 1934—a project which will include the electrification of 1300 miles of track and cost $100,000,000. In speaking of this project, W. W. Atterbury, President of the Pennsylvania, says, "The electrically-powered train makes better time and can haul greater loads. It has a quicker pick-up in starting and can be stopped in a much shorter distance than the steam powered train. Between Washington and New York the use of electric power will give us more than the equivalent of an additional track. It will cut a full hour or more of our present running time without sacrificing one iota of safety. It will eliminate the smoke nuisance and the bother of stopping the train for taking on coal and water." He further predicts that a fourteen hour schedule between Chicago and New York will be a simple matter when that route is electrified.

## Advantages of Electricity over Steam

Electricity has overcome one of the greatest burdens of the Iron Horse, that of "packing his lunch." The steam locomotive consumes an enormous amount of coal. In carrying fifty loaded cars of coal a distance of 600 miles the engine consumes the equivalent of seven of these carloads and, returning the empty cars, three more carloads are used up, a total consumption of 20% of the load hauled. On the other hand an electric locomotive gains its motive power from an overhead wire, eliminating the necessity of carrying supplies.

Because of the time required for building and extinguishing fires, turning at terminals, cleaning fire boxes, cleaning boiler tubes, a general overhauling, a steam locomotive can spend only about one-half of its life on the road. In contrast to this an electric locomotive can show an average of 90% of its time in actual service. The Chicago, Milwaukee, St. Paul, and Pacific Railroad has records to show that an electric freight locomotive will run a half million miles without need of a serious overhauling. The New York, New Haven, and Hartford Railroad has electric locomotives in the freight classification yards which have operated 24 hours a day for 30 consecutive days. If it is true that "time means money", steam locomotives are certainly an economic waste.




View of a Westinghouse 400 H. P. Oil-Electric locomotive

The thermal efficiency of the average steam locomotive is from 5% to 8%, the latter figure being the result of the most recent developments in steam transportation. Contrast this with the electrically driven locomotive having an efficiency from 80% to 90%, the 20% to 30% efficiency of the power house, and the comparatively slight losses in the power transmission lines. It is no wonder electricity is marching to the foreground.

The "Business Week" presents figures showing an average cost of $0.90 per thousand ton miles of traffic moved by electrical power against $1.59 per thousand ton miles moved by steam, representing a saving of 43%. In additon to this, when hydro-electric plants are used to supply power for locomotives, the cost of operation of an electrified railway becomes about one-fourth the cost of steam operation. Incidentally, there is sufficient water power available to supply one-third of the total existing railroad miles in the United States with electrical energy.

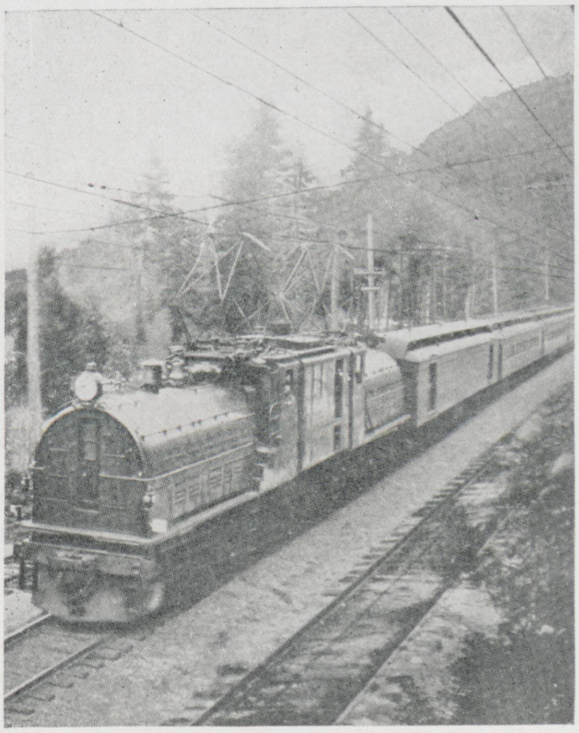
In the design and construction of the type of motor used in the electric locomotive, engineers have developed two desirable features that steam propulsion will probably never possess. The first is the principle of regenerative braking, namely, that a motor driven mechanically above its normal speed becomes a generator. By actual test it has been proven that an electric train going down a hill puts 30% of the power back into the line that would be required to drive the same train up the same hill. In other words the train momentarily becomes a "power house". The second feature is an effect of the first. This regenerative braking enables a train to go 30% faster downhill with as much safety, and saves consequent wear and tear that would be caused by wheel braking.

The relatively new Diesel-electric locomotive is continually gaining more prominence in the field of railway transportation. Its great flexibility together with its many other advantages presents a topic for discussion in itself. The fact that no overhead wire or third rail is required in the self-contined unit greatly reduces the first cost of installation. By using direct current generators, which would be practical in power transmission lines, a direct current series motor having a high starting torque may be used to great advantage. These features, inherent to the Diesel-electric locomotive, render it readily adaptable to freight yards and terminals.

## Comparative Power of Electric and Steam Locomotives

The Chicago, Milwaukee, St. Paul, and Pacific Railroad has some interesting data concerning the power of the electric engine. Formerly two steam locomotives were required to pull thirteen loaded steel cars up a 2.2 percent grade, and could reach a maximum speed of only nineteen miles per hour. Now one electric locomotive can pull the same load over the same grade and easily maintain a speed of twenty-five miles per hour. The same electric can make the entire run between Harlowton, Montana and Tacoma, Washington, a distance of 677 miles, at top speed without injury. On the other hand there are few steam locomotives capable of making over 300 miles at a run.

The Virginian Railroad formerly hauled 5500-ton trains over the mountainous part of its road with the straining assistance of three of the most powerful locomotives, having 59 drivers and weighing 1270 tons. It was only with the greatest effort that the train could maintain a maximum speed of six or seven miles per hour. Since electrifying the route a 6000-ton train may be operated smoothly over the same track at fourteen miles per hour with only a single electric locomotive at each end of the train. As a result, the Virginian Railroad has replaced 48 of its former giant steam locomotives by 12 new electric ones with a net gain in locomotive effectiveness.



Electricity is replacing the steam locomotive in mountainous country

## Passenger Service

Traveling becomes more luxurious and pleasant on electric trains; there are no odors, no smoke, no fumes, no dirt that comes from a belching, puffing steam engine. There are no stops for coal and water, and no delays on account of frozen pipes. The cars are electrically heated in cold weather. The late Thomas A. Edison, after passing over 600 miles of Chicago, Milwaukee, St. Paul and Pacific electrified road, gave the following impression of his experiences, "No grinding, no jerking, no puffing, no straining, no disturbed slumbers—just a keen sense of moving swiftly, of being propelled by power vastly in excess of requirements. You ride with ease—you are at ease—it is the very last word in transportation."

## Future in Electrification

Samuel M. Vauclain, Chairman of the Baldwin Locomotive Works, makes this statement concerning the future of electrified railroads, "Regardless of the expense to which our railroads must be put, electrification must eventually be installed."

F. H. Shepard, director of heavy traction of the Westinghouse Electric and Manufacturing Company, says, "Electrification of the future will be used to provide a vast increase in the capacity of speed and movement."

A new age is dawning before us. The old Iron Horse is giving way to the younger and mightier steeds. Steam is passing away; electricity is here to bear the burden of railway transportation. Tomorrow it will be the motive power dominating our highway of travel and commerce.

# THE ROSE TECHNIC

*Member Engineering College Magazines Associated*

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## School Spirit

One of the things necessary to maintain satisfactory and wholesome conditions within a college is school spirit. Without it no institution can remain on a high level. With it a great many things are possible.

Thus school spirit may be thought of as the principle of vital energy of the college. The institution having it seems endowed with a peculiar ability, activity, and influence. It is therefore the pervading influence or animating principle, but, because of its peculiar quality and character, it is difficult to define. A person possessing the right kind of school spirit is unselfishly loyal to his Alma Mater. He will do all in his power, consistent with honor, to further interests.

For some time there has seemed to be a decline in the proper spirit among Rose students. This is a unique condition at Rose for we have always had the reputation for solidarity, willingness to tackle any problem, and to support student enterprises. There is no reason why there should be any deviation from these principles. Let us inquire into the reasons for becoming lax in their observance.

As time goes on the requirements of a college graduate become more exacting. The average student is likely to feel that he has little time for anything connected with the school except his studies. He becomes so engrossed in his own welfare that he fails to take part in or give his support to the various college activities with the result that because of this these activities no longer come up to the standard which in turn decreases the students' interest in them. Before long some particular organization disbands, some activity ceases to exist. All of this tends to force the student further into his shell. It is not long before remarks are being made about the poor condition of the school, the absence of activity becomes noticeable to outsiders, and a great deal of actual harm is done to the school.

The individual student is likely to consider it none of his affair. But upon the individual student rests the entire responsibility. The modern college has no place for the self-contained student. The mere grind has little chance of real success either in college or in industrial life.

The little cliques that have sprung up in certain classes must be discouraged. They actually retard class work. They are inimical to the best interests of the class and the school. Some means must be provided whereby the student may get away from the narrow outlook. Something must be produced which will give the students a chance of working together toward a common goal. Cooperation is a firm foundation for school spirit. It is up to each individual student to help revive a declining school spirit.

## Laboratory Reports

There is probably no one thing that irks the average college student more than the preparation of laboratory reports. The course is distinctly listed as a one, two, or three credit course. Each credit is supposed to represent about three hours work per week, the work being recitation, study, or actual manipulation.

In the average one credit laboratory course at least two hours must be spent in assembling the apparatus and doing the experiment. The time for preparing and writing the report varies between wide limits, but it is a rare experiment that can be performed, results calculated and interpreted, and the report written in good form in less than three hours. The average report takes much longer, not infrequently taking twice that time.

It is a fallacy to say that the student derives no good from such a procedure. However, he has other things to do besides writing reports, and often he may neglect his other studies if he spends half the night preparing his laboratory work for the next day. Then too often he does not get the full benefit of his work because the instructor fails to mark the papers promptly, or fails to give any constructive criticism that might help the student to prepare a better report next time.

It must not be inferred from the above that all instructors are lax in the performance of their duties. It is realized that they too have other work to do. But if laboratory reports are to assume the importance indicated by the time required to prepare them, then surely the student has a right to full cooperation from his instructor in preparing a good report in a minimum time.

## Season's Greetings

It is a matter of fact, regardless of what cynical people may say, that the Christmas season is the one time of the year when the majority of people, regardless of their creed or belief, really feel a bond of universal brotherhood. Past grievances are forgotten for the moment, friendships are cemented more strongly, the general feeling is not to "live and let live" but to live and help others to live.

If in some magical way the spirit of Christmas could be spread over the entire year, many of our economic and political ills would disappear. This is perhaps too much to hope for, but it is not too much to strive for.

It is the sincere wish of those connected with this publication that you, its readers, may have the merriest of merry Christmases.

## College for everyone?

America is often characterized by her policy of mass production. Is the American college also to fall into the same kind of classification?

It seems to the writer that there has been far too much of the belief that every man should have a college education. One may find in the United States almost any type and grade of institution. There is scarcely a person alive who could not get a diploma from one of these institutions. The whole idea seems to be to get a sheepskin so that a B. S. or B. A. may be written after your name.

As a result there are far too many college graduates today who should never have sat in a college classroom, and far too many who have been denied an education when they were worthy of it.

No room should be made for the fellow who is below average intelligence. He may be better educated in a trade as a skilled workman. Colleges should continue to elevate their standards. A college education must be made to mean something more than four years spent in an institution.

As long as colleges depend upon enrollment to help defray expenses, very likely the cause of education must suffer. But can anyone say with justification that the better policy would be to deny education to no one who is mentally above average, but to everyone else?

# The Technic Letter Box

Editor of the Rose Technic
Dear Sir:

I am enclosing an editorial concerning fraternity politics. In submitting it I wish it clearly understood that I have no personal grievance against the fraternity system as a whole or any one fraternity on the Rose campus. Fraternities can be made very beneficial to individuals and to institutions, but they can also exert a harmful influence.

In making the statements that I have, I am backed by the opinions of many Rose students both organized and unorganized as well as by the opinions of some national authorities on the subject.

Yours very truly,
Richard K. Toner, Ch. E. '34

## Fraternity Politics

If one is to believe the symbols of clasped hands, the altruism expressed in framed creeds, one may be led to believe that the college fraternity is truly the home of modern knighthood. However, watching a fraternity in action is like observing the petty political groups of any small American town.

Say what you will about the merits of organization, fraternity politics are no more worthy of their place in a group with high ideals than are the politics of America worthy of association with the ideals of our forefathers. If they achieve some worthwhile purpose it is more by accident than by choice.

Let us observe their working in a college such as Rose. One group who look upon themselves as kings of the campus take it upon themselves to rule the students, not overlooking the advantages they may gain by so doing. By the marvelous piece of mechanism known as the interfraternity council, they obtain the rights and privileges of naming the leading campus officers in return for giving the other fraternities what they can not get away with themselves. These other organizations, too small and weak in themselves to do anything, gladly assent and the elections are held.

The unorganized students usually sit by and do nothing. Occasionally, as in the recent senior class election, they become so tired of being told what to do by some one often less capable than one of their own group that they rise up in rebellion. This sometimes upsets the fraternity machine, exposes cliques within the organization, causes a lot of hard feelings and the like.

If fraternities could be satisfied with a few class officers, perhaps nothing would be said, for after all who does less work than a class officer? But no, wherever Alpha Beta Gamma can get a member or pledge appointed to a position it does so, even at the expense of a more deserving person. It is quite often true that a more deserving fraternity member is forgotten because his list of telephone numbers is not so complete as another's.

Indirectly (as well as directly if one may believe the statements of some of those connected with it) the honorary activities fraternity is affected by this system. To be eligible for election one must have a good activities record; to have a good activities record is much easier if the fraternity machine is behind one; once eligible, fraternity bonds are no handicap to election.

Because of the social fraternity, the American college is about as democratic as the country in which it is located.

# SPORTS

Edited by
Harry H. Richardson,
m., '35

## Rose vs. Gary

ROSE journeyed up to Gary and took another one on the chin to the tune of 12-0. This, however was not the fault of the Engineers entirely. Gary proved to be one of the toughest teams, individually, that Rose has encountered in a number of years.

Gary received the kick-off, and on the third play of the game Smith got away for a sixty yard run after reversing his field. Gary then made a first down on the Rose eight yard line, but there the Rose defense stiffened and Gary lost the ball on downs after gaining no ground on four plays. Richardson then dropped back into the end zone and got off a long kick to the Gary twenty-eight yard line. Gary made a number of first downs, but couldn't do much in the way of scoring as the Rose defense inside their own twenty proved to be too much for them. In the second quarter a number of reverses through tackle and around end gave Gary a first down on the Rose four yard line. The third line smash gave them a well-earned touchdown. The old "wait a minute" play was smothered in the try for the extra point.

In the third quarter Gary again scored after a long pass had given them a first down on the Rose three yard line. Their try for the extra point failed.

Rose was under a great handicap during this game because only once was the ball outside of their own thirty-five yard line. In the last quarter Rose started a drive from their own twenty-five yard line that was climaxed when Yates snagged a pass on Gary's twenty yard line for the last play of the game.

Yates and Landenberger played a great defensive game for the Engineers while Hufford, Campbell, and Richardson bore the brunt of the offensive work.

Lineup and summaries:

Rose—0 Gary—12

| Rose— | Pos. | Gary—12 |
|---|---|---|
| Laughlin | L.E. | Massette |
| Newsome | L.T. | Jenske |
| Maehling | L.G. | Malayter |
| Landenberger | C. | Fleming |
| Lyons | R.G. | Biers |
| Leitzman | R.T. | Miscovich |
| Yates | R.E. | Cooper |
| Hufford | Q.B. | Lessard |
| H. Richardson | L.H. | Smith |
| F. Richardson | R.H. | Ricard |
| Cauley | F.B. | Miller |

Scoring by quarters:

| | | | | |
|---|---|---|---|---|
| Gary | 0 | 6 | 6 | 0—12 |
| Rose | 0 | 0 | 0 | 0— 0 |

Touchdowns—Gary: Smith, 2.

Substitutions—Rose Campbell, Eyke, Fox, Tait.

## Rose vs. Earlham

Rose took their worst lacing of the season, as far as the score is concerned, when they went to Richmond and lost to the Quakers by the score of 46-13. The Engineers got off to a poor start against the wind, and Earlham scored twice in the first quarter. The first touchdown resulted directly from a pass into the end zone, and the second was the indirect result of a long end run that gave them a first down on the Rose five yard line. Earlham scored again when they intercepted a pass in mid-field, and, with excellent blocking, ran the ball half the length of the field. The half ended with the score standing at 19-0.

Rose started their second string men in the second half. Earlham took the ball on the third play and ran fifty yards around left end for a touchdown. On the kick-off, Steinbrecht, a substitute back, carried the ball behind some nice interference for eighty yards and another touchdown. Earlham made two more touchdowns before the period ended to make the score 46-0 in favor of Earlham.

Rose then got the first break that came their way this season as Earlham punted out of bounds on their own thirty-five yard line. Three consecutive first downs put the ball on the Earlham two yard line first down. Cauley then carried the ball over the final stripe on two line smashes. Leitzman kicked the extra point.

In the final quarter Rose, with the first team back in the lineup, gained possession of the ball on their own forty-five, and made a sustained drive for a touchdown against the Earlham first string which had been hastily substituted. Hufford's try for the extra point against a high wind struck the upright and bounced back into the field. The game ended with the ball in the possession of Rose in the Earlham territory.

The Rose defense did not function very well as is indicated by the score. Sentman and Cauley seemed to be the only ones that could gain much ground.

Lineup and summaries:

Rose—13 Earlham—46

| Rose | Pos. | Earlham |
|---|---|---|
| Wodicka | L.E. | Dickonson |
| Tait | L.T. | Gottschalk |
| Lyons | L.G. | Overman |
| Landenberger | C. | Albertson |
| Colburn | R.G. | Hill |
| Cavanaugh | R.T. | Hunt |
| Yates | R.E. | Johnson |
| Bard | Q.B. | Moore |
| Campbell | L.H. | Batty |
| Forte | R.H. | Hall |
| Fox | F.B. | Kausel |

Scoring by quarters—

| | | | | |
|---|---|---|---|---|
| Rose | 0 | 0 | 7 | 6—13 |
| Earlham | 13 | 6 | 27 | 0—46 |

Touchdowns: Earlham—Steinbrecht 3, Moore, Keusel, Hall, Hadley. Rose—Cauley 2.

Points after touchdowns: Earlham—Kausel 2, Batty 2. Rose—Leitzman.

## Rose vs. Indiana State

Rose dropped a 38-19 decision to their traditional rivals in a hotly contested game at the Stadium. The score does not in any way indicate the type of game it was. The Engineers, with a string of seven losses out of as many starts behind them, dove into this game with as much, if not more spirt than I have ever seen displayed by a Rose eleven. The team never gave up, and deserve a lot of credit for fighting as they did against the much talked-of Normal eleven. Normal, who had cleaned up every team in the state with the exception of Valparaiso, were figuratively fifty points better than Rose, but that didn't make a bit of difference to the Engineers as they scored more points in this game than they had all season.

Normal went into a quick lead in the first quarter when Bush circled left end for five yards and the first marker. They scored twice more in the first quarter as Larkins caught a long pass on the Rose five yard line for the first one, and Bush scampered eighty-five yards for the second one. This made the score 19-0 in favor of Normal, as the try for the extra point after the second touchdown was good.

Rose then received a break when Bush and Spence kicked a fumbled punt around, and Rose recovered on the Normal eighteen yard line. Campbell went around left end on the fourth play for five yards and the first Rose score. Richardson's try for the extra point was wide.

Normal scored in the second quarter after Spence took the ball on a spinner from a punt formation through the middle of the line to the Rose two yard line. Spence also made the touchdown on a line play. The kick for the extra point was good.

Rose then forced Normal back to their own ten yard line, where they were forced to kick. A poor kick went out on the twenty-five yard line. One line play netted the Engineers four yards, and then Richardson made a first down on a reverse over right tackle. Two more plays put the ball on the one yard line after the referee ruled that Richardson had not carried the ball over the goal line. Cauley then smashed his way through right guard for the second Rose marker. Richardson's place kick for the extra point was good, making the score 26-13 as the half ended.

Normal scored twice in the third quarter. Bush, clever State quarterback, made them both. This made the score 38-13, and so Normal sent in her second team. During the remainder of the third quarter neither team could do much, and the ball remained in midfield most of the time.

The Normal first team came back to start the last quarter, evidently intending to put the Engineers to rout. They had not reckoned, however, with the great spirit of the Rose eleven, and Rose was the team to score in the last quarter. Ashworth, Normal tackle, was put out of the game because of unnecessary roughness, and the added penalty gave the ball to Rose on their opponents thirty yard line. Here the Engineers showed their spirit and fight by really driving the ball over the goal line for a touchdown. After making one first down, Rose was up against it with fourth down and three to go. Scornful of the air route, the Engineers slammed into Normal and Campbell ripped off thirteen yards. On the next play, Campbell again went off left tackle, this time for a touchdown. This ended the scoring, as Richardson's try for the extra point was blocked.

The entire team is to be congratulated upon their play in this game. Captain Landenberger, in his last game for Rose, played a great game at center.

Lineup and summaries:

Rose—19 Indiana State—38

| Rose | Pos. | Indiana State |
|---|---|---|
| Laughlin | L.E. | Miklozek |
| Newsome | L.T. | Ashworth |
| Lyons | L.G. | Pack |
| Landenberger | C. | Budd |
| Colburn | R.G. | May |
| Cavanaugh | R.T. | Fessenden |
| Yates | R.E. | Larkins |
| Hufford | Q.B. | Bush |
| Sentman | L.H. | Spence |
| Richardson | R.H. | Shouse |
| Cauley | F.B. | Franklin |

Scoring by quarters—

| | | | | |
|---|---|---|---|---|
| Rose | 6 | 7 | 0 | 6—19 |
| Normal | 19 | 7 | 12 | 0—38 |

Touchdowns: Rose—Compbell 2, Cauley. Normal—Bush 4, Spence, Larkins.

Points after touchdowns: Rose—Richardson 1. Normal—Shouse 2.

Substitutions: Rose—Campbell, Fox, Leitzman, Tait.

## Letters Awarded

At a meeting of the Student Athletic Board on Tuesday, November 22, the following men were awarded letters and sweaters: Landenberger, Cauley, Newsome, Leitzman, Yates, and Maehling, seniors; Richardson, Colburn, Cavanaugh, Tucker, Lyons, Eyke, and Bard, juniors; Hufford, Campbell, Forte, West, Tait, Laughlin and Sentman, sophomores; and Fox and Wodicka, freshmen.

Two managers, McGurk and Welsh, were given sweaters. Ketchum, cheer leader, was given a minor letter because of his work and interest this year. The board is going to try to make this award every year.

At a meeting of the football lettermen on November 25, Harry Richardson was elected Captain of the 1934 team.

# Ornamental Street Lighting System for Terre Haute, Indiana

By Brent C. Jacob, e., '34

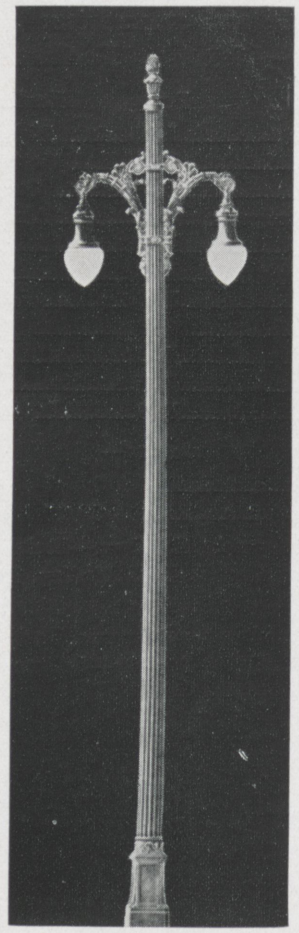
FOR several years Terre Haute has suffered from a street lighting system which has steadily been growing worse. The general financial condition has been sufficient cause for delay in providing any improvement in the system which has suffered both from the natural wear of old age and from the inferiority of the system as compared with more modern methods of street lighting.

However, it is to be hoped that the condition need not endure. The federal government has provided large sums of money which are to be spent in public works, and are available to cities which fulfill certain conditions. The plan for the use of the borrowed money must be approved in Washington as a project which not only provides employment, but which also wil be of real and lasting value to the public.

It is under this plan that Terre Haute hopes to install a fine new ornamental street lighting system. The proposed plan calls for approximately $60,000 worth of material and labor, and if the plan is successful in meeting the requirements fixed in Washington, Terre Haute will borrow from the national government $60,000 with the understanding that it shall pay back to the government 70% of this money in yearly installments of value of 10% of the whole sum, starting in the fourth year after borrowing, and that the 30% which remains need not be paid back to the national government.

The object of the plan of the national government is to provide real employment and to maintain progress in communities which otherwise would be forced to degenerate as a result of the depression. To Terre Haute this means a gain in safety, beauty, and a real gain against unemployment and its associated evils.

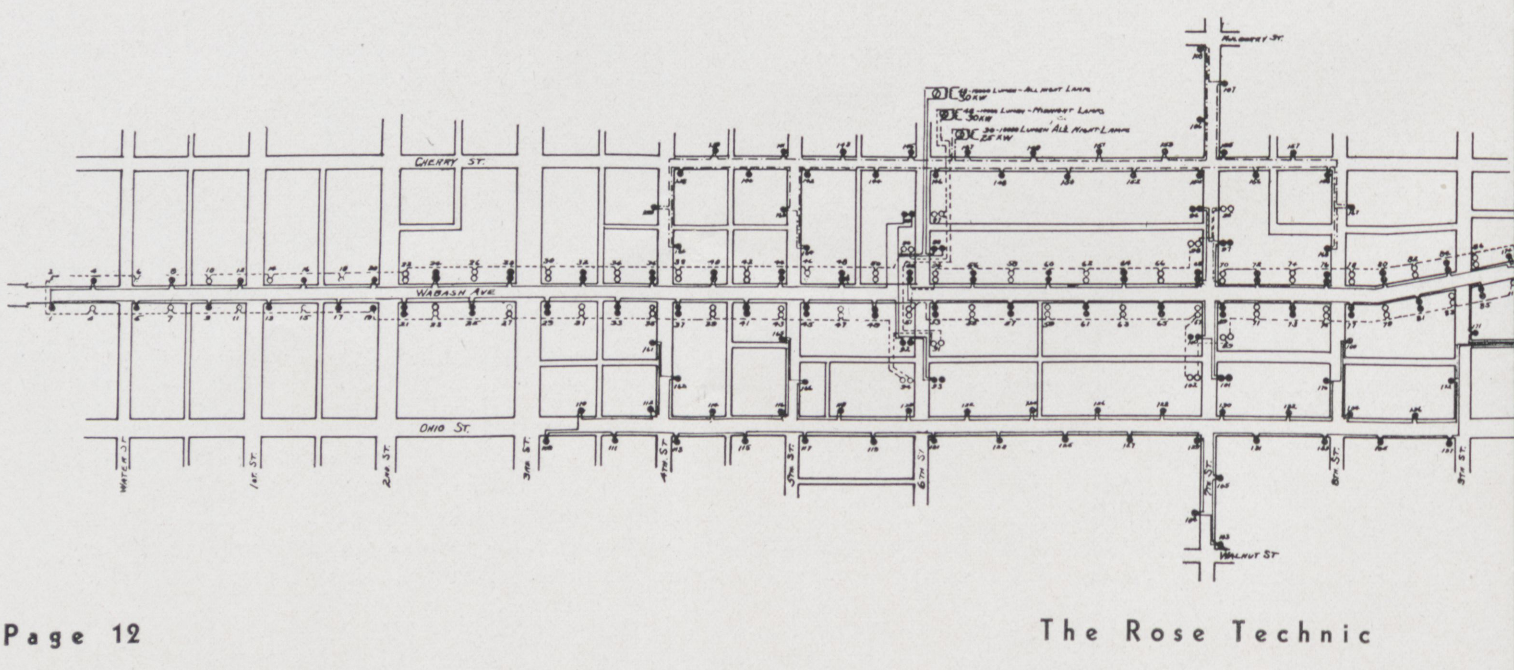
The project has been engineered to provide whiteway lighting in the main districts of Terre



Twin Unit Lamp, 10,000 Lumen Type

Haute all night, and the standards will be located as shown in the accompanying diagrams.

As proposed, there will be an arrangement whereby part of the lights in some of the sections may be turned off at midnight, leaving the others lighted. In the district where twin units are to be located there are two alternate plans for achieving this end. Either alter-



nate standards may be illuminated after midnight or one branch on each standard may be illuminated. As regards economy either scheme is workable. For beauty the alternate standard method may be better, while from the standpoint of uniformity of illumination the other system would probably serve better.

## Type of Lamp to be Used

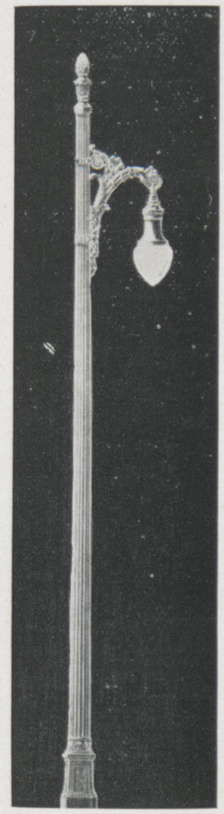
The lamps are to be of the twenty ampere filament type to be operated on a series circuit. Each lamp will be protected by means of an oxide film cut-out which automatically cuts the lamp out of the circuit in the event of excessive voltage. The twenty-ampere lamp was chosen for its high efficiency, and for its ruggedness which is vital to long life in street lighting. All lamps used will be either the 10,000 or the 6,000 lumen type, designed to burn base down. In every case the twin units will be supplied with the 10,000 lumen lamps, and in the case of the single units, there will be supplied lamps of power to suit the requirements of illumination at the particular section where they are located. In all there will be 82 twin units, 55 single units with 6000 lumen lamps, and 127 single units to be fitted with 10,000 lumen lamps. Of these lamps, 49 of the 6,000 lumen lamps are to burn all night, and 111 of the 10,000 lumen lamps will burn all night. The remaining lamps will burn till midnight.

The light sources of the single standards are to be located 18 feet above the ground, and of the twin units are to be 22 feet above the ground. In each case the total height of the unit is to be 27 feet 6 inches. The trolley spans are to be supported from the lighting standards in those localities where the traction lines run, and consequently the fixtures have to be designed to handle this added strain.

Option has been given to the bidders in the choice of metal or "granite" standards. For each type rigid specifications have been made to insure high quality and good appearance. In case the "granite" standards are chosen they must be made of spun concrete properly aged and of very uniform characteristics so as to present an appearance similar to granite and to be mechanically sound. There are two choices in the metal types. One builds the ornamental shell around the supporting inner pole, while the other makes the ornamental shell of sufficient mechanical strength to furnish the complete structure in itself.

All the metal parts of the fixtures to be placed on the poles are to be of such composition or so protected that they cannot stain the concrete poles nor mar the metal ones.

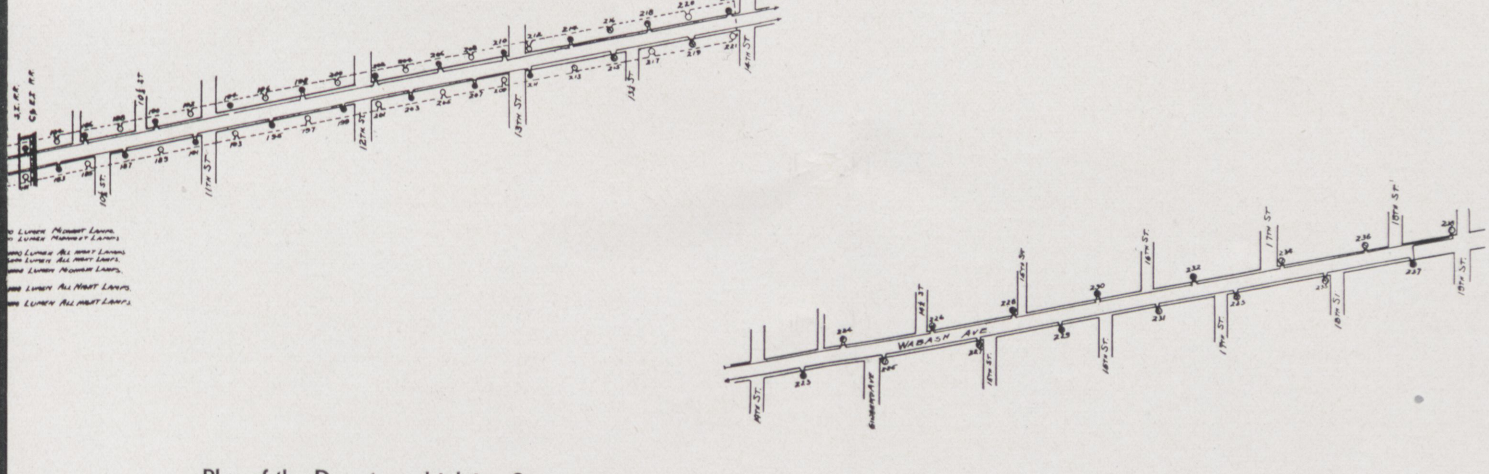
The enclosing glassware will be designed to give a sparkling appearance, to diffuse the light sufficiently, yet to give a high efficiency by low absorption. It has to be practically self-cleaning to maintain the above mentioned qualities. In the single units only, there are to be refractors which will give an asymmetirc distribution of light, providing most of the light in the direction along



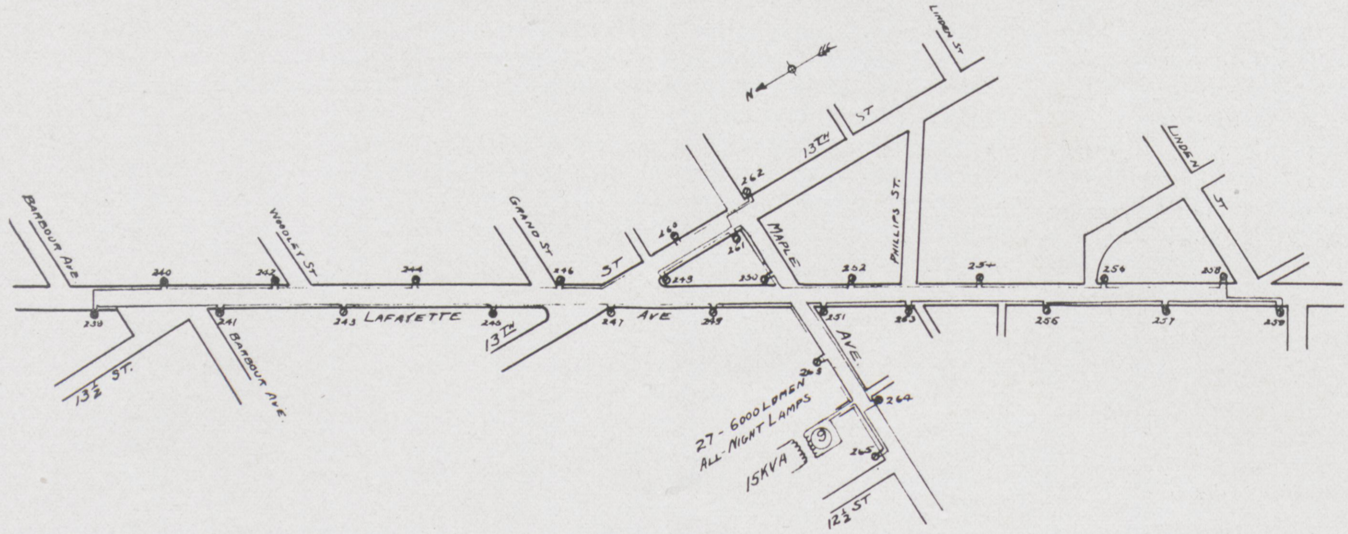
Single Unit, 6,000 Lumen Type

the center of the street, and reducing the light lost away from the street.

Power for the lighting system is to be distributed through the medium of three substations, each complete in itself.



Plan of the Downtown Lighting System



Plan of the Twelve Points District

Substation number one will be located in the alley North of Cherry Street, East of Sixth Street, and will have one 30 KW constant current transformer for street lighting with a primary coil designed for 2300 volts, and a secondary coil designed to supply twenty amperes. It will have also a 25 KW transformer of similar type. Each will have a set of associated equipment to protect the time of opening and closing of the lighting circuits.

The second substation will be located on Ninth and a Half Street South of Wabash Avenue, and shall have the same equipment as number one plus a 15 KW transformer of similar type and its associated equipment.

The third substation will be located in the alley north of Maple, west of Lafayette, and will supply the power for the equipment and to control the Twelve Points district. It will have one 15 KW transformer of the same type and its associated equipment.

The cuts show the various types of lighting units as called for in the specifications.

The information for this article was obtained from the specifications and from Professor C. C. Knipmeyer who is Consulting Engineer on the project.

# Student Directory

## Freshman Class

Robert A. Averitt, Terre Haute
R. R. 6

William E. Batman, Louisville, Ky., 2613 Montrose Ave.

Frank E. Blount, Montezuma

Robert E. Bond, Terre Haute
2618 N. 8th St.

Lawrence Carroll, Terre Haute
1220 S. 5th St.

Phillip Cartwright, Terre Haute
7th & Haythorne, R. R. 4

Edward A. Coons, Mattoon, Ill.
1101 S. 15th St.

Ben G. Courtney, Fort Wayne
406 West Rudisell Blvd.

Stanley L. Cox, Terre Haute
724 N. 8th St.

Clyde E. Cromwell, Terre Haute
1512 S. 8th St.

Earl T. Cromwell, Terre Haute
1512 S. 8th St.

Joseph A. Dillahunt, Sullivan
303 Indiana Ave.

Roland A. Donie, Vincennes
4th & Hart St.

Alden B. Foley, Clinton
957 Morey St.

F. Duane Ford, Sullivan

John W. Fox, Urichsville, O.
577 N. Water St.

Alechi F. Garzolini, W. T. H.
Box 101, R. R. 2

Paul E. Giffel, Terre Haute
1312 N. 9th St.

H. J. Halberstadt, Terre Haute
2307 Third Avenue

J. J. Hatcher, Mingo Junction, O.
313 Murdock Ave.

Donald T. Hehman, St. Bernice

John H. Heltsley, Vermillion, Ill.

William R. Huff, Brazil
R. R. 5

James A. Hughes, Terre Haute
2118 Second Avenue.

John M. Jacobson, Duluth, Minn.
4531 McCullough St.

Walter W. Juntgen, Terre Haute
533 N. 7th St.

Stephen Koos, Terre Haute
2401 Maple Avenue.

P. F. Kristan, Wallingford, Conn.
229 William St.

George Landenberger, Olney, Ill.

Robert L. Lindsey, Terre Haute
111 N. 8th St.

Albert Lotze, Terre Haute
2015 College Avenue.

Walter Luken, Terre Haute
78 S. 19th St.

Howard Mohr, Struthers, O.
143 Center St.

Burt F. Raynes, Clinton
343 S. Fifth St.

Charles F. Rich, Terre Haute
101 S. 20th St.

John R. Richardson, Terre Haute
1536 S. Center St.

John T. Ricketts, Terre Haute
41 Barton Avenue.

Rhiman Rotz, Carmel, Ill.
R. R. 2

Robert I. Sears, Terre Haute
1936 N. 7th St.

Garland H. Setzer, Graysville

Morris D. Smith, Anna, Ill.
Anne Slate Hospital

W. Stuart Smith, Terre Haute
2500 N. 9th St.

Walter R. Snedeker, Terre Haute
2136 Third Avenue.

John B. Stineman, Terre Haute
127 S. 16th St.

W. M. Tappan, Hibbing, Minn.
2125 4th Ave.

Thomas N. Wells, Martinsville, Ill.

Robert W. White, Farmersburg

Carl R. Wischmeyer, Terre Haute
203 Madison Blvd.

Hubert Wittenberg, Terre Haute
121 Gilbert Ave.

Edward J. Wodicka, Terre Haute
1659 First Ave.

## Sophomore Class

Jack G. Bacon, e., Terre Haute
103 Hudson Ave.

Paul D. Bennett, c., Farmersburg

Francis M. Blair, e., Terre Haute
2131 S. Center St.

Oscar M. Brosey, m., Terre Haute
2526 Schaal Ave.

James Campbell, m., Terre Haute
1655 Second Ave.

William R. Creal, ch., Terre Haute
2052 N. 7th St.

Edward Denehie, e., Terre Haute
1448 Fifth Ave.

Louis Duenweg, e., Terre Haute
681 Swan St.

C. T. Evinger, e., Terre Haute
1224 N. 6th St.

John A. Forte, m., Clinton
514 N. 9th St.

H. E. Garmong, ch., Terre Haute
1819 Washington Ave.

R. J. Harrod, m., Terre Haute
2009 Ash St.

Robert Hopewell, ch., Terre Haute
1655 Fifth Ave.

Edward E. Howard, m., Shelburn

J. D. Hufford, m., Terre Haute
817 S. 17th St.

W. E. Kasameyer, m., Terre Haute
333 Kent Ave.

R. E. Kiefner, ch., Terre Haute
2420 N. 10th St.

R. R. Laughlin, m., Terre Haute
2400 First Ave.

E. B. Leever, m., Terre Haute
51 S. 23rd St.

Martin Long, e., Erie, Penn.
1220 West 10th St.

Hubert Lyon, ch., Brazil
R. R. 5

Paul H. McKee, e., Terre Haute
1116 Sycamore St.

Charles E. MacDonald, m., Brazil
1402 N. Meridian St.

John W. Mann, m., Indianapolis
R. R. 7, No. 202

J. Robert Marks, m., Brazil
722 N. Walnut St.

Carroll R. Merriman, c., Kokomo
1709 S. Buckeye St.

Richard Metz, e., Terre Haute
63 S. 12th St.

A. B. Mewhinney, e., Terre Haute
1138 N. 10th St.

F. W. Modesitt, m., Terre Haute
1012 N. 9th St.

Wilmot S. Moore, m., Brazil
1015 N. Meridian St.

E. J. Mueller, m., Terre Haute
2021 S. 9th St.

D. Overholser, ch., Indianapolis
570 E. Fall Creek Blvd. No. 3

Byron Pierson, c., Bloomingdale

Jack Roberts, R. R. 2, Brazil

Joseph B. Ross, c., Terre Haute
Butternut Hill

N. A. Salisbury, ch., Terre Haute
246 S. 22nd St.

W. S. Sentman, m., Mt. Vernon
601 N. Canal St.

R. W. Spain, m., Terre Haute
2325 Liberty Ave.

W. G. Staley, ch., Terre Haute
212 N. Fruitridge Ave.

R. Stamn, m., Wauwatosa, Wis.
1826 North 69th St.

Samuel Tait, c., Chicago, Ill.
1153 N. Karlov Ave.

J. Lyon Utter, ch., Terre Haute
521 N. 7th St.

R. A. Waddell, e., Winthrop, Mass.
9 Maple Road.

J. H. Walker, ch., Terre Haute
2338 Garfield Ave.

A. M. Weinbrecht, ch., T. H.
716 Ash St.

John B. West, m., Evanston, Ill.
502 Lake St.

J. E. Whitesell, m., Terre Haute
2224 N. 10th St.

E. W. Wilber, ch., Pittsburgh
527 Morwood Ave.

## Junior Class

R. B. Asbury, m., Terre Haute
2510 N. 8th St.

Albert L. Bard, c., Brazil
5 E. Kruzan

J. A. Bradley, m., Terre Haute
146 S. 23rd St.

Gordon L. Burt, c., Terre Haute
111 S. 23rd St.

E. B. Butler, c., Bogota, N. J.
206 Maplewood Ave.

E. E. Carrico, c., Louisville, Ky.
729 S. 36th St.

G. E. Cavanaugh, ch., T. H.
601 S. 19th St.

E. J. Cody, Jr., m., Terre Haute
1228 S. 6½ St.

D. Colburn, c., Menominee, Mich.
1218 Wabash

N. H. Cromwell, ch., Terre Haute
1512 S. 8th St.

J. A. Cushman, Jr. m., T. H.
R. R. 4

Claude C. Dierdorf, m., Brazil
718 S. Forest Ave.

W. C. Eyke, c., Muskegon, Mich.
534 Webster Ave.

John J. Fuller, m., Terre Haute
807 S. 20th St.

John P. Giacoletto, e., Clinton
912 Bogart St.

John J. Hager, ch., Terre Haute
1130 S. 9th St.

Jay F. Hall, e., Cleveland Hts., O.
3046 Euclid Hts. Blvd.

E. A. Hamilton, c., Terre Haute
1456 S. 9th St.

L. Heck, c., St. Mary-of-the-woods

Arthur W. Hess, c., Terre Haute
1300 S. 10th St.

James H. Hoffman, ch., Brazil
R. R. 5

Albert L. James, ch., Terre Haute
119 Madison Blvd.

Russell Kerr, a., Indianapolis
Route 19, Box 227

M. W. Kroesch, ch., Terre Haute
824 N. 8th St.

John K. Loman, m., Cutler

Louis S. Lyon, ch., Terre Haute
1643 First Ave.

Harry McCord, m., New Castle
403 S. Main St.

A. V. McEowen, c., Indianapolis

Burril F. McIntyre, e., Brazil
508 N. Columbia St.

Karl L. Mason, m., Terre Haute
R. R. 5, Box 165

John F. Mayrose, c., Terre Haute
1230 S. 18th St.

B. P. Melton, c., Terre Haute
2137 N. 14th St.

P. C. Montgomery, e., Shelbyville

J. C. Nelson, m., Lawrenceville, Ill.

E. Fred Newman, m., Terre Haute
221 N. Fruitridge Ave.

Bert L. Pearce, m., Terre Haute
1513 S. 4th St.

William S. Pratt, c., Brazil
R. R. 2

Paul Presnell, e., Terre Haute
R. R. 5

C. W. Price, Jr., ch., Terre Haute
1918 N. 10th St.

Paul H. Reedy, e., Terre Haute
1600 College Ave.

*(Continued on Page 18)*

# Power Losses

**Edited by Nelson B. Trusler, e., '35**

Pledge (knocking at senior's door): You told me to call you in time for your first class, but I didn't wake up myself. It's ten o'clock now, your class is over, and you can sleep as long as you want.

---

HE DID HIS BEST

"So," sobbed Illma Vaselineovitch, "Ivan Ninespotski died in battle! Did you say he uttered my name as he was dying?"

"Part of it," replied the returned soldier, "Part of it".

---

SAFETY FIRST

He was not moved by chivalry,
Nor feared the look of scorn.
He offered her his street car seat
To keep her off his corn.

---

EVOLUTION

Freshman: "I don't know."

Sophomore: "I do not remember."

Junior: "I am not prepared."

Senior: "I don't believe I can add anything to what has been said."

---

"I fell downstairs with two pints of rye."

"Did you spill any?"

"No, I kept my mouth closed."

---

Stamm: "They've got an insane asylum in Milwaukee."

Trunky: "They've got one in Indianapolis, too. I pass it every time I come to Terre Haute."

Stamm: "That's alright, they'll never recognize you."

Trunky: "How's that?"

Stamm (disgusted): "They aren't used to seeing people like you on the outside."

---

"Waiter, two orders of Spumoni Vermicelli, please."

"Very sorry, sir, but that's the proprietor, sir."

—*Princeton Tiger.*

"What is the International Law on straits?"

"A straight flush beats a full house."

---

An optomist is a stude who dates a nice girl on the night before an anatomy exam.

—*Virginia Tech Engineer.*

---

Old Lady to Old Tar: "Excuse me—do those tattoo marks wash off?"

Old Tar: "I can't say lady."

—*Annapolis Log.*

---

"Do you drink anything?"

"Yes, anything."

---

Guard: "Sir the prisoners are rioting again."

Warden: "What's the matter now?"

Guard: "The chef used to cook for a fraternity house."

—*Michigan Gargoyle.*

---

Conductor: "Listen here, young man, I've been on this train for seven years."

Young Man: "Is that so? Where did you get on?"

---

"Oh, fadder, there's a fly in my soup."

"Shush! Vait until you get it half eaten, den call de vaiter."

---

Two stuttering blacksmiths had finished heating a piece of pig-iron, and one placed it upon the anvil with a pair of tongs.

"H-h-h-hit it," he stuttered.

"Wh-wh-wh-where?" asked the other.

"Ah, h-h-h-hel-ell, now we'll have to heat it again."

---

"A fat woman always feels bigger than she looks."

"Who told you that?"

"No one, I danced with one last night and found out for myself."

She laughed when he sat down —but when he began to play!

—*College Life.*

---

"My girl is a good sport."

"Mine isn't so good looking, either."

---

Judge—"What have you to say for yourself, sir?"

Stude—"Your honor, I am a poor Poly sophomore."

Judge—"Ignorance excuses no one, sir. Ten dollars and costs."

---

After looking at the intelligence rating of the freshman class, the powers that be, said: "We expect every freshman to graduate." But the students after looking at mid-term exam grades, no doubt, say: "Oh, yeah?"

---

Mr. Moench: "Please don't put your feet up there, Mr. Self; it not only marks up the wall, but you might tip your chair over, thus awakening someone near you."

---

Kolinsky Jr.: "Here's the garbage man, father."

Kolinsky Sr.: "Tell him we don't want any."

---

Ivan: "How do you like the electric washer you got from America?"

Mrs. Kakanovitch: "Not so good, Ivan. Every time I get in the thing the paddles knock me off my feet."

—*Farmer's Advocate.*

---

Frosh: "What kind of oil do you use in your car, Bill?"

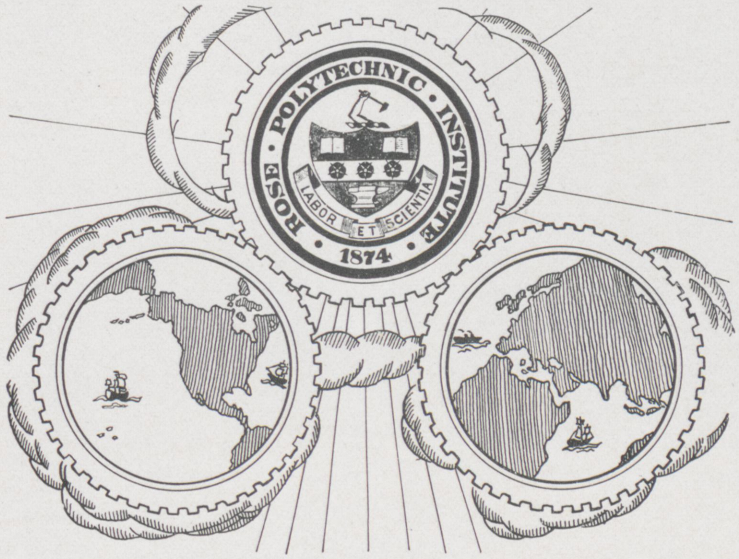
Soph: "Well, I usually start out by telling them I'm lonely."

---

"Do you serve fish here?"

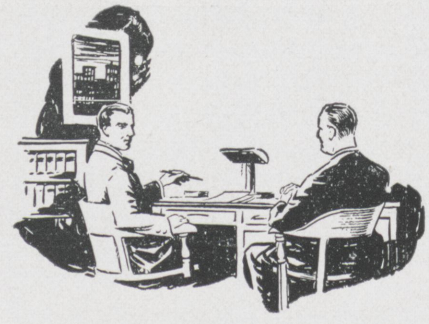
"Sit down, We serve anybody."

—*Pennsylvania Triangle.*


ROSE POLYTECHNIC INSTITUTE
LABOR ET SCIENTIA
1874

# Alumni

## Edited by Jay F. Hall, e. '35



### Rose Tech Clnbs

The regular fall meeting of the Pittsburgh Rose Tech Club was held at the University Club on November 13. This meeting was called earlier than is customary because Mr. E. D. Frohman, the new President, wanted to get the views of the Club as to how he may best serve. Mr. Frohman is also planning to visit some of the other Rose Tech Clubs in the near future.

In the past we have not received many notices concerning the meetings of the alumni clubs, but we hope that from now on each club will notify us of its meetings and send us as much news as possible of the alumni for our columns.

### Here and There With The Grads

**'08** Paul G. Lindeman who is Vice-President of the Foulkes Contracting Company of Terre Haute, visited the Institute December 2.

**'09** Roy F. Tyler, General Signal Inspector of the C. M. St. P. and P. R. R., also visited the Institute December 2.

**'11** Henry R. Voelker is a partner in the Newman-Voelker Company, in Louisville, Kentucky. This company is a distributor of sanitary supplies.

**'23** Ralph B. Bennett who is working with General Electric has been transferred to Indianapolis.

**'27** William Hammerling is now with the Kelvinator Corporation at 14250 Plymouth Road, Detroit, Michigan, as Field Service Representative traveling in South and and East Africa, India, and the Dutch East Indies. In about a month Mr. Hammerling will move to India, but until that time he can be reached at the following address: c-o American Consulate, Capetown, South Africa.

**'29** Collins W. Raines of Sullivan, Indiana, now has a position with the Indiana State Highway Commission.

**'30** Gilbert L. Shew, of West Terre Haute, is now teaching in the high school at New Goshen, Indiana.

**'31** Harold Kehoe, who has been in the Insurance department of the Terre Haute Trust Company has a position with the Indiana State Highway Commission.

The engagement of Miss Gertrude F. Bolenbaugh of Lancaster, Ohio, to Harry J. Loving has been announced. At the present time Mr. Loving is working in Cincinnati, Ohio.

**'32** Charles E. Howard has recently been married. He and his wife are living in Evansville, and Mr. Howard is working for the State Highway Commission.

William A. Haynes, Jr., has taken a position with the Liberty Electric Company of Indianapolis, Indiana.

Owen Howson has been employed by the Kentucky Utilities Company at Richmond, Kentucky.

Paul Carter has a position with the State as surveyor, and is now working in Clay County.

Abraham H. Goodman has taken a position with the American Maize Products Company at Roby, Indiana.

Albert Ahlers is a Lieutenant in Co. 529, C. C. C. Camp Death Valley Junction, Death Valley, California.

Clifton A. Pratt, lieutenant in the C. C. C., has recently been transferred to Clearfield, Ky.

**ex. '33** Louis Max Eyerman who has been employed in the City Engineer's office at Louisville, Kentucky, has completed a law course in his off hours, and has opened an office in the Marion E. Taylor Building at Louisville. He means to specialize in scientific and real estate matters.

---

### Students Dirctory

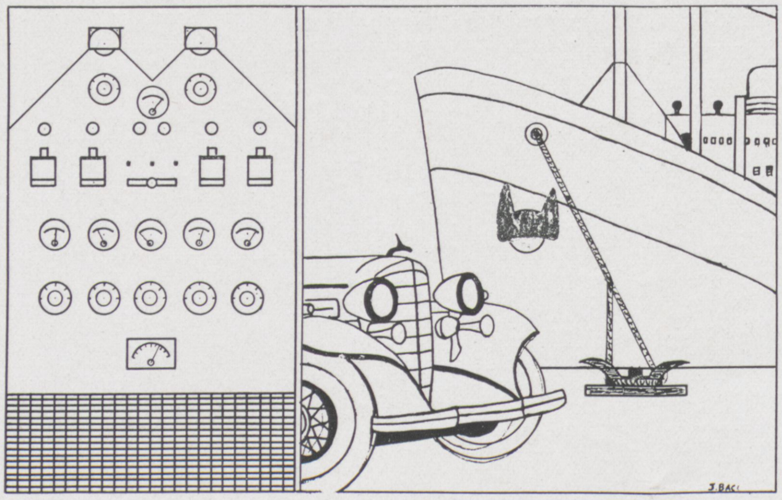
*(Continued from Page 15)*

Harold Reintjes, ch., Terre Haute
3236 S. 7th St.
F. H. Richardson, c., West Baden
H. H. Richardson, m., Cleveland, O., 3040 Euclid Hts. Blvd.
Robert W. Self, e., Terre Haute
1543 S. Center St.
V. E. Shaw, c., Coral Gables, Flo.
802 SW 40th Ave.
Wayne G. Siegelin, e., Brazil
T. Smith, ch., Wyandotte, Mich.
334 Highland Ave.
John A. Straw, e., Clinton
1057 S. 4th St.
C. Wendell Templeton, e., Sullivan
311 N. State St.
P. B. Terhorst, m., Terre Haute
944 N. 9th St.
Nelson B. Trusler, e., Indianapolis
442 N. Randolph St.
N. E. Tucker, ch., Terre Haute
1623 Woodlawn Ave.
J. B. Weaver, ch., Marshall, Ill.
E. J. Welsh, m., Louisville, Ky.
2120 Garland Ave.
John H. Welsh, m., Louisville, Ky.
2120 Garland Ave.
Fred W. Wiles, m., Struthers, O.
50 Hauthorne St.

### Senior Class

Russell E. Archer, e., Terre Haute
1515 N. Center St.
John Babillus, e., Staunton

H. C. Barnes, e., Terre Haute
1717 Woodlawn Ave.
W. Belstrom, c., Negaunee, Mich.
210 Teal Lake Ave.
Willis S. Biggs, ch., Peoria, Ill.
425 Missouri Ave.
Noble C. Blair, a., Louisville, Ky.
125 S. Galt Ave.
James G. Brown, ch., Terre Haute
1410 S. 6th St.
A. J. Burgert, m., Terre Haute
615 N. 12th St.
S. P. Cauley, ch., Robinson, Ill.
2055 Roosevelt Ave.
R. Danner, Jr., m., W. T. H.
45 N. 7th St.
H. H. Douglas, ch., Terre Haute
531 S. 8th St.
John A. Doyle, e., Brazil
609 E. Church St.
Ward W. Engle, a., Bloomingdale
Elvin L. Everett, c., Terre Haute
2225 Liberty Ave.
Henry Fick Jr., e., Terre Haute
1451 Woodley Ave.
Jack H. Foulkes, m., Terre Haute
1141 S. Center St.
Paul F. Froeb, m., Terre Haute
220 S. 16th St.
R. C. Hornung, e., Terre Haute
123 S. 16th St.
B. C. Jacob, Jr., e., Cleveland, O.
12330 Forest Grove Ave.
H. C. Johnson, e., Terre Haute
1125 S. 24th St.
John H. Keller, c., Terre Haute
105 S. 17th St.
Edward Ketchum, ch., Paris, Ill.
Clifford Lamb, e., Terre Haute
107 Hudson Ave.
F. J. Landenberger, m., Olney, Ill.
R. Larsh, ch., Nebraska City. Neb.
Ernest Leitzman, e., Terre Haute
681 Eighth Ave.
H. A. McAninch, m., Indianapolis
229 E Ohio St.
H. L. McGurk, m., Terre Haute
2206 N. 10th St.
L. R. Maehling, e., Terre Haute
1349 Third Ave.
F. Mansur, e., Santa Anna, Calif.
1129 E. Washington
James I. Mason, m., Seeleyville
J. R. Mattingly, a., Terre Haute
315 S. 6th St.
J. A. Moore, ch., Greencastle
411½ E. Seminary St.
A. G. Morrison, c., Terre Haute
1453 S. 8th St.
Robert J. Motz, c., Terre Haute
514 Chestnut St.
Jack Newsom, a., Worthington
Jack B. Nickel, c., Sullivan
Marshall C. Powell, e., Evansville
14 N. W. Second St.
John A. Ritter, m., Evansville
10 Taylor
Paul R. Smith, ch., Terre Haute
1704 Garfield Ave.
H. A. Stadermann, e., Terre Haute
2114 S. 7th St.
G. F. Stark, m., Terre Haute
59 Home Ave.
Loren Thompson, c., Terre Haute
1906 Idaho St.
R. K. Toner, ch., Terre Haute
701 S. 19th St.
Maurice Tucker, e., St. Louis, Mo.
1143 Walton
A. W. Tuemler, m., Terre Haute
819 S. 3rd St.
R. W. Updike, m., Indianapolis
1356 So. Sheffield Ave.
Norman E. Watson, e., Hillsdale
John A. Wilson, m., Terre Haute
302 First Ave.
Albert L. Yates, c., Terre Haute
1926 N. 9th St.
W. W. Yost, m., Terre Haute
3021 Fenwood Ave.
Gene A. Zwerner, e., Terre Haute
2420 N. 8th St.



# Research and Progress

Edited by
John A. Ritter, m., '34

## Cosmic Explosion Speed Limit

SEEKING to link the extremely minute realms of new quantum mechanics with the wide-flung scope of mechanics of relativity a Cambridge actronomer has presented new mathematical equations which may receive the acceptance of the Royal Society of London.

To obtain tractable equations in linking microscopic quantum mechanics and microscopic relativity it was found necessary to use something mathematically simpler than the kilogram as a comparison of the standard of mass. As an intermediary, therefore, was used an ideal uniform distribution of matter, described as a sort of ether.

One result of the equation that can be tested by observational astronomy is that there is a limiting speed of recession of the nebulae, or the so-called redshift or Doppler effect. This is a sort of upper speed limit from the explosion or expansion of the universe and has been calculated as 780 kilometers per second per megagasec.

## Aluminum Mirrors

Stars that are hotter and brighter than science ever heretofore conceived, which make our own sun look like a candle beside a powerful beacon, have been "captured" in aluminum mirrors of the Boothroyd expedition.

For the first time the ultraviolet spectra of about 80 stars have been photographed, opening up to astronomers an entire new field in the study of stellar matter and stellar temperatures.

This feat was accomplished through a new process developed lately by which chromium and aluminum can be deposited on glass. The silver-coated mirrors hitherto used in reflecting telescopes have been able to capture the spectrum only as far as the yellow-green region, and were unable to catch the high wave lengths of violet emanations, which tell more than anything else about the temperature and the condition of the star.

The first test of this new invention confirmed the previous ideas on the hotness of certain stars, and indicated that some of the so-called dim stars are in reality brighter photographically, than those before considered brightest. These very hot stellar bodies are called "blue stars" as contrasted with the red and yellow stars. They are dim, if not wholly invisible, to the human eye because their ultraviolet rays escape the eyesight. The aluminum coated mirror has proved much more effective than the human eye in this case.

Considerable work is still needed in practical tests but the new type mirror has become established in astronomical circles.

## Odor Remover

Complete removal from air of a wide variety of odors, including amylacetate and other acetates, mercaptans, hydogen sulfide, and other gases and vapors, is said to be effected by a new odor filter just recently developed. This equipment may be used either for air-conditioning systems or for industrial systems, for the production of pure air for processing and for elimination of plant nuisances.

The filter employs a bed of granular, activated, coconut-shell carbon as the absorbing agent. It is stated that in most installations, filters will operate about one year without reactivation. Filters are built up of steel units in which the carbon is retained by 22-mesh wire cloth.

## Rotor Power

Lately Julius R. Madaras demonstrated a full-size windpower rotor unit at Burlington, N. J. With an eleven-mile wind blowing, the 4,000 pound duralumin shell, 90 feet high and 22.2 feet in diameter was spun smoothly at a rim speed of 50 miles per hour.

No power was generated by the wind rotor. Generation of power by this equipment will require the mounting of the rotor on a railway truck, and moving it with similar rotors, around a large circular track. It is proposed to utilize the pressure on the rotating towers to push the tower cars along the track and through generators mechanically to the wheels for generating electricity.

The object of the spinning of the rotor, which actually consumes a portion of the power generated, is to increase enormously the net thrust transporting the cars. The principle involved is the well known "Manus effect" illustrated by the side draft of spinning baseballs and artillery projectiles.

Before the rotation demonstration, visitors inspected the machinery basement, under the tower. Of outstanding interest were the large steel strain gauges designed to measure a thrust of fifteen tons or more. Some time ago the same principle was suggested as a means of propelling ships, but proved to be impracticable although theoretically sound.

## Damping Elevator Vibration

High speeds that are developed by modern transport airplanes introduces many new problems to be solved by aeronautical engineers. Among these is the problem of eliminating elevator flutter which is apt to occur with the conventionally constructed elevator at speed in excess of 200 miles per hour. Army engineers have determined that the heavier the elevator the greater is its tendency to flutter, and they recommend that metal be used as little as possible for elevator structure in order to cut down the weight.

A vibration dampener has been devised by the Lockheed Co. taking into consideration the 226 miles per hour top speed of their new Orion. It consists of a five pound lead weight on the end of a curved arm which is attached to a special torque rib in each elevator. The arm, a dural casting, is shaped so as to extend over and above the elevator hinge, and hold the weight directly in the center of a recess in the stabilizer when the elevator is in the neutral position. Only when the elevator is raised or lowered does the weight protrude below or above the stabilizer surface into the air stream. The weight having a different period of vibration from the elevator, in effect dampens out all noticeable vibration of the elevator.

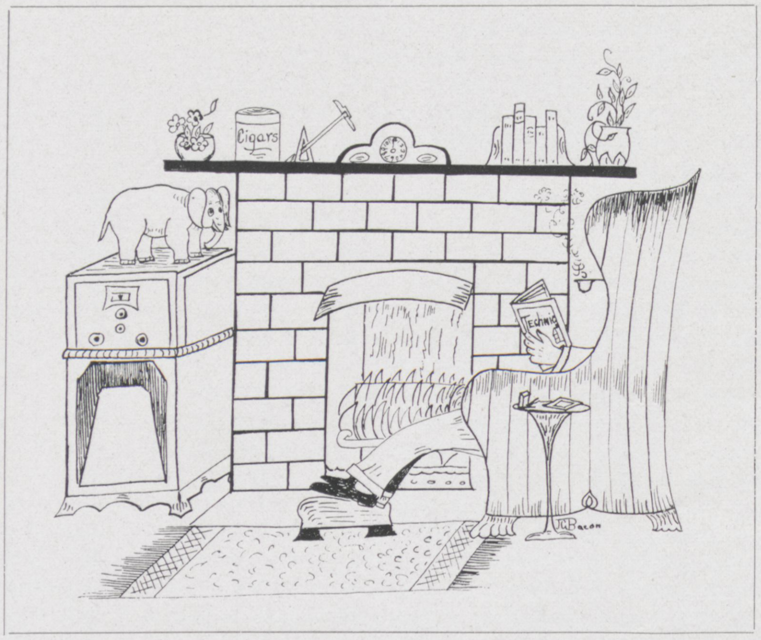


The entire counterbalance installation weighs six pounds for each side. It gives a 70% static balance around the elevator hinge reducing the movement of the elevator to 30%. No attempt is made to achieve a dynamic balance.

## Rubber Filler

One of the latest things in the manufacture of rubber is the use of calcium carbonate as a reinforcing pigment. The calcium carbonate used is a precipitate of extremely fine particle size. The surface of the particles is coated with approximately two per cent of a rubber-soluble organic material which prevents cementation of the individual particles and gives complete dispersion of the pigment in the rubber. The use of this pigment is said to give considerably higher values of tensile, tear, and abrasion resistance than other reinforcing rubber pigments, except the gas blacks.

At approximate loadings, tensile and tear resistance values, hitherto obtainable only with soft gas black, can be reached with the use of calcium carbonate. Its use is indicated in rubber stocks requiring high tensile and high resistance to tear and abrasion, especially where regular black stock is not desired, or where a relatively soft modulus is desired along with high physical properties.




# Fraternity Notes

## Sigma Nu

A dance was held at the chapter house on the evening of December eighth. The chaperones were Dr. and Mrs. Hoel and Professor and Mrs. Bloxsome. Music was furnished by an orchestra. Everybody enjoyed the occasion.

On November 27, Earle Butler, Harry Richardson, Jay Hall, and Hayden Richardson were pledged by Tau Nu Tau. Sigma Nu is pleased to see that they are again well represented in the military field.

Harry Richardson has been elected captain of the 1934 Rose football team.

The prominence of the men of Sigma Nu upon the Rose campus was further demonstrated when Earle Butler was elected to the Blue Key fraternity. Earle is the only man to be given this honor so far this year.

## Theta Xi

On the night of Nov. 3 the members of the active chapter were the guests of the Theta Xi club of Terre Haute at a smoker held at the chapter house. The high light of the evening was a talk by Hubert H. Merrill; the remainder of the evening was spent playing cards.

Kappa chapter wishes to take this opportunity to congratulate Nelson B. Trusler and pledge Norman Cromwell, who have pledged Tau Nu Tau. Al Bard will receive a letter for his work on the football team.

Plans are well under way for the annual Christmas social event and from the reports given out by the social committee it promises to be even more successful than the one staged last year.

Kappa of Theta Xi congratulates Harry Richardson on his being elected captain of next year's football team.

## Tau Nu Tau

Tau Nu Tau, honorary military fraternity, announces the pledging of Lieutenant Garges and all members of the junior class who are taking the advanced military training. These men have been chosen by the fraternity to carry on the ideals of the fraternity after they have served a satisfactory period of pledgeship and of probation.

A meeting of the active members of the Rose chapter of Tau Nu Tau was held November 20, 1933, at the Theta Kappa Nu house. Plans for the annual Military Ball were discussed and the tickets placed on sale.

## Tau Beta Pi

Indiana Beta of Tau Beta Pi is pleased to announce that on Wednesday evening, November 22, Howard Barnes, Brent Jacob, Jack Keller, Harry McGurk, and William Eyke were initiated. It is our sincere belief that these men will continue to excell in those qualities for which Tau Beta Pi stands: scholarship, integrity, breadth of interest, and unselfish activity.

Following the initiation, a dinner was held at the Elk's Club. Mr. Moench gave a very interesting discussion of his experiences with the Bell Telephone Company, interpolating some very valuable points on the spirit of research.

## Alpha Tau Omega

Indiana Gamma Gamma is very pleased to announce the initiation of the following men on Nov. 19: A. G. Morrison, '34; John Bradley, Virgil Shaw and John Hager, '35; Raymond Laughlin, Edward Leever, Paul McKee, William Kasameyer, '36. The initiation was formal and was followed by a buffet lunch at the house. The newly elected Province Chief, J. J. Maehling, presented the new members with their badges.

Plans for the Christmas Formal are not completed, but the dance will be held December 20, at the Terre Haute House. Mr. Ernest Welsh is the chairman of the committee.

There were several men from A. T. O. who received letters for football this year: Harry McGurk was presented with a senior manager's sweater and letter, John Welsh was presented a manager's sweater with letter, and Lyle Maehling, Louis Lyons, William Eyke, Ray Laughlin, James Hufford, James Campbell, and Warren Sentman received varsity letters.

Harry McGurk, Jack Keller, and William Eyke were initiated into Tau Beta Pi on November 22.

## Alpha Chi Sigma

On November 8 a professional meeting was held at the Theta Kappa Nu house. Dr. White gave a discussion of the points for and against another Rose Show. Mr. Moench and Mr. Hunter gave very interesting talks about some of their experiences.

The annual pledge dinner was held at the Elk's Club, Friday, November 24. At this meeting the freshman pledges presented the chapter with a very attractive electrically lighted badge of the fraternity. They are to be commended on their excellent workmanship. Following the dinner, all the new pledges presented humorous papers which were greatly enjoyed by those present.

Iota is very happy to announce that on December 15, Mr. Mann, Mr. Cavanaugh, and Mr. Weaver were initiated into the chapter. We wish these men much success in their fraternity work.

Those Alpha Chi Sigma men who were with the senior chemists on their trip to St. Louis had the pleasure of meeting H. E. Wiedeman one of the grand officers of the fraternity. He acted as guide for the party.

## Theta Kappa Nu

On Saturday, November 25, all of the hunters of the chapter borrowed their neighbors, shotguns and made war on the rabbits. After a day's strenous exercise the company disbanded to meet again the following evening at the chapter house for the annual rabbit banquet.

# Campus Activities

Edited by

Daniel Overholser, ch, e., '36

## Examinations

With midterm examinations over, the student must not feel that he can rest until the finals approach. On the contrary, since midterms merely show each student his rating in the class for the work completed during the first period, the student may see whether or not he is spending enough time on his lessons and whether the time spent has been applied in the correct way. Each man should be able to determine the cause of his trouble.

The student is apt to take his midterm results seriously. It is to his advantage that he does take them seriously, but not too seriously. The man who makes a poor mark on the midterm has, by no means, determined his final grade. By diligently planning his work and by studying it thoroughly throughout the remainder of the semester, he may demonstrate his power of right thinking.

## Congratulations

On November 19th, Warrant Officer Sylvester Kearns and Miss Kathryn Wright were married in Paris, Illinois. The entire school joins in congratulations and best wishes.

The groom, who is better known to the student body as "Sarge", is on detail here at Rose.

## Senior Chemists' Field Trip

On December 8, the senior chemists left for a three day trip to St. Louis. This is the most extensive trip attempted in recent years, but it was well worth the time and expense.

The party left Terre Haute about 7 o'clock Friday morning and reached St. Louis by noon. After lunch, the guide, Mr. H. E. Wiedemann, a Rose graduate, took the party to the Monsanto Chemical plant, where contact sulphuric acid and other important chemicals are made. The afternoon was spent in touring this splendid plant.

That evening a dinner meeting with the St. Louis Rose Tech Club had been arranged. The Rose students were very glad of the opportunity to meet the grads and discuss conditions with them.

Saturday was occupied in visiting the Shell Refineries at Wood River, Illinois. Another plant visited that day was the Missouri Portland Cement Company's plant near St. Louis.

Saturday evening and Sunday morning were spent in looking over St. Louis itself. Forest Park, the theatres, and other places of amusement were visited.

The group left for Terre Haute on Sunday afternoon, agreeing that the trip had been very profitable as well as entertaining. The Rose students wish to express their appreciation to Mr. Wiedemann, both for his assistance in arranging the plant trips and in preparing the alumni dinner.

## Senior and Junior Mechanicals' Field Trip

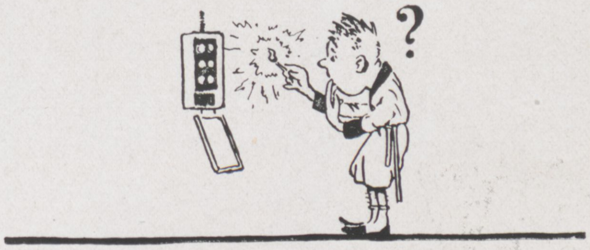
On November 22, Doctor Prentice and Mr. Gray drove eight of the junior and senior mechanicals to Purdue University, Lafayette, Indiana, where a combined meeting of the Indianapolis-Lafayette section of A. I. E. E. and the Indianapolis section of the A. S. M. E. was held.

At 6:30 P. M. dinner was served in the Memorial Union Building, followed by an interesting program. Mr. R. H. George, of Purdue Engineering Experiment Station, gave the first public demonstration of a practical television system. News reels were transmitted from Purdue television transmission station to the meeting room, one-quarter mile distant. Mr. J. W. Esterline, President of the Esterline-Angus Company, talked about: "The Present Responsibility of the Engineer as a Citizen." Mr. L. H. G. Bouscaren, Vice President of the Stone and Webster Engineering Corporation, talked about: "Selling the Services of the Engineering Profession."

## Appointment

Professor C. C. Knipmeyer has been appointed by the Governor a member of the Indiana State Board of Registration for Professional Engineers and Land Surveyors. This board passes upon the qualifications of engineers wishing to practice engineering within the state. It is a member of the National Council of State Boards of Engineering Examiners, and has reciprocal relations with other state boards in permitting the practice of engineering in other states.

# G-E *Campus* News



### CENTLESS CIRCUITS

Conspicuous in nightmares of power company officials are ingenious, economical human beings who tinker with electric circuits, who rig up outlandish but convenient wiring. As a crowning touch to their handiwork, when fuses blow they use a penny. Lights go on. Protection goes out the cellar window.

To foil these handy-men-about-the-house, and to end blown-fuse troubles forever, G.E. has developed an ounce of protection — a little circuit breaker to replace the old-fashioned fuse box. It looks very much like an ordinary lighting wall-switch. When a "short" occurs, the arc is interrupted inside a small, closed, metal chamber in 0.008 of a second. A mere flip of the handle restores service.

Protection? The performance is so mild you can hear nothing and see nothing, even when 5000 amperes are being interrupted. And the breaker is safe and foolproof, too. The complete line will include ratings from 15 to 600 amperes. Let no more bridged-fuse bogeys disturb anyone's slumbers.

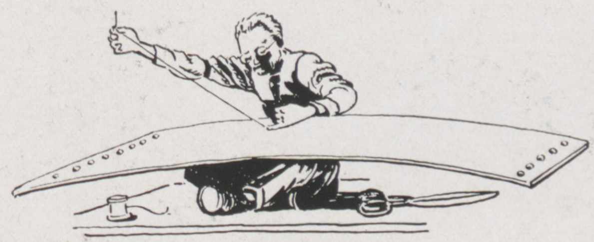
J. W. Seaman, Antioch College, '29, was very active in this development.

### HATS OFF TO THIS ONE

The Sutorbilt Corporation of Los Angeles had a problem — to remove dried cocoanut meat (it's copra in the tropics) from a ship's hold to railroad cars at the rate of one ton every 60 seconds. That sounds like a lot of d.c.m. to most people — but it had to be done.

They built a machine with an 8-inch flexible metal throat and an amazing appetite. Not content with devouring copra, this machine gobbles up shiploads of potash, soda ash, borax, shale, grain, nuts — and even nibbles at the shirts, trousers, and hats of bystanders.

How? A G-E compensator starts a 150-hp. motor. An air compressor comes up to speed. Nature begins to "abhor a vacuum," and up comes everything but the bottom of the ship. If you have a cellar full of copra to be moved — or any similar problem — let us know.



### STITCHING STEEL

Why not use vacuum tubes for speeding-up welders? So thought our engineers as they were working on the problem of stitching steel plates together with the rapidity of a sewing machine.

Thyratron-tube control for resistance seam welders resulted. H. W. Lord, '26 graduate of the California Institute of Technology, received a Charles A. Coffin Foundation Award* for developing an accurate timing circuit using Thyratron tubes — an important part of the control. Industry obtained a new high-speed production tool.

This control, when applied to line- or spot-welding machines, permits 1200 current interruptions per minute. Thus, it makes possible the stitching together of thin metal sheets to form gas-tight and water-tight seams. Thyratron-controlled machines will weld stainless steel, mild steel, chromium- and cadmium-plated steel, aluminum alloys, and many other materials. Steel barrels, pails, milk cans, and gasoline tanks are just a few of the many products now produced faster as a result of Thyratron welding control.

*A highly-prized company award, named after one of the founders of General Electric, that is awarded annually to selected employees for meritorious service.

96-5DH

**GENERAL ELECTRIC**

# _about Cigarettes


## Of all the ways in which tobacco is used the cigarette is the mildest form

YOU know, ever since the Indians found out the pleasure of smoking tobacco, there have been many ways of enjoying it.

But of all the ways in which tobacco is used, the cigarette is the mildest form.

Everything that money can buy and everything that Science knows about is used to make Chesterfields. The tobaccos are blended and cross-blended the right way — the cigarettes are made right — the paper is right.

There are other good cigarettes, of course, but Chesterfield is

***the cigarette that's milder***
***the cigarette that tastes better***

# Chesterfield

*They Satisfy*.. just try them